



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
C. Kent Aldridge

Serial No.: 09/966,487

Filed: September 28, 2001

For: METHOD AND APPARATUS FOR
INSTALLING BEARING SEALS AND
BEARING INCORPORATING SAME

§ Group Art Unit: 3726

§ Examiner: Compton, Eric B.

§ Atty. Docket: DODG:0046/YOD
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APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 1.191 AND 1.192

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on September 24, 2003, and received by the Patent Office on September 29, 2003.

1. REAL PARTY IN INTEREST

The real party in interest is Reliance Electric Technologies, LLC, the Assignee of the above-referenced application by virtue of the Assignment to Reliance Electric Technologies, LLC recorded at reel 012228, frame 0080 on September 28, 2001.

2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellant's legal representative in this Appeal. Reliance Electric Technologies, LLC, the Assignee of the above-referenced application, as

evidenced by the documents mentioned above, will be directly affected by the Board's decision in the pending appeal.

3. **STATUS OF CLAIMS**

Claims 8-21 and 38-47 are currently pending, and claims 8-21 and 38-47 are currently under final rejection and, thus, are the subject of this appeal.

4. **STATUS OF AMENDMENTS**

No claims were amended after the final rejection by the Examiner. All amendments filed previous to the final rejection have been entered and considered.

5. **SUMMARY OF THE INVENTION AND OF THE DISCLOSED**

EMBODIMENTS

A wide range of bearing systems and assemblies are known and presently in use. *See Application, page 1, line 11.* In general, antifriction bearings include an outer race or ring, an inner race or ring, and a series of bearing elements disposed between the races. *See Application, page 1, lines 14-15.* The bearing elements may include balls, rollers, needles, tapered rollers, and so forth. *See Application, page 1, lines 15-16.*

In certain environments, it is extremely useful to shield and seal the internal volumes of bearing assemblies from the surrounding environment. *See Application, page 1, lines 21-22.* For example, seals are commonly used in bearing assemblies to retain lubricants within the assemblies, thereby reducing wear, lubricating the internal components, and extracting heat from the components. *See Application, page 1, lines 26-27.* Seals and shields are also used to preclude the ingress of external contaminants and particles from the internal volumes of assemblies. *See Application, page 1, lines 25-26.* This may be particularly useful where surrounding environments are particularly dirty, corrosive, or wet. *See Application, page 1, lines 26-27.*

In the field of seal bearing assemblies, various approaches have been used for securing seals to bearing rings. *See Application, page 2, lines 1-2.* Where seals are installed on bearing rings, they are typically held in place by tight or interference fits designed between portions of the seal assembly and corresponding internal or external surfaces of the bearing rings. *See Application, page 2, lines 4-6.* While such attachment is often satisfactory, the seals can become damaged or loosened during use. *See Application, page 2, lines 6-7.* Where seal assemblies are displaced, such as by bumping or imbalance of loading on the machine or the bearing, the seal may become an impediment to the normal functioning of the machine, or may cease to function effectively as a seal. *See Application, page 2, lines 7-9.* Such retaining techniques may also be prone to damage during installation or servicing. *See Application, page 2, lines 9-10.* In any of these events, the seals may require costly and time consuming repair or replacement. *See Application, page 2, lines 10-12.*

The Appellant recognized a need for an improved technique for attaching and securing seal assemblies to bearing components. The present invention provides a novel technique for securing seals and seal assemblies in bearings designed to respond to such needs. *See Application, page 2, lines 22-23.* In accordance with certain aspects of the present technique, seals 22, 28 may be installed on both the inner ring 16 and outer ring 18 of a bearing assembly 10. *See Application, page 5, lines 11-15.* The rings 16, 18 designed to receive the seals 22, 28 include an interface surface 32, 36 in which a groove may be formed. *See Application, page 6, lines 2-8.* The seal assembly is positioned adjacent to the interface surface 32, 36 and is crimped or similarly plastically deformed to mount the seal assembly to the receiving ring. *See Application, page 6, lines 18-27.*

Figure 3 illustrates an exemplary installation station 42 for securing a seal 22 to an outer ring 16 as described above. The system 42 illustrated in Figure 3 is adapted for mounting in a press (not shown), such as a hydraulic press. The system includes a base or pot 44 closed at its lower end by a stop 46. The pot 44 is open at its upper end, and a tapered ring 48 is secured about the inner periphery of the upper end. A crimping collet

50 is positioned within the pot 44 and bears against the tapered ring 48. The crimping collet 50 includes a series of crimping sections 52 designed to be forced radially inwardly by the tapered ring during the crimping operation.

For attachment of the outer ring seal to the outer ring, force is applied to the upper cup 60, as indicated by arrow 62 in Figure 3. With the outer ring 16 in place within the seal 22, and with the seal centered by the seal support cup 58, the force applied to the outer ring urges the collet 50 downwardly, thereby forcing the radial contraction of the crimping section 52 by interaction with the tapered ring 48. The crimping operation is stopped upon full engagement of the crimping section and full deformation and securing of the seal as indicated by arrow 72 in Figure 5.

Figure 6 represents a similar installation system 74 for securing a seal 28 to an inner ring 18. In the system of Figure 6, a pot 76 is provided in which a stop 78 is positioned. An upper end of the pot 76 is open, with a tapered ring 80 being disposed around the inner periphery of the open upper end. A crimping collet 84 is positioned within the pot and bears against the tapered ring 80. Crimping sections 86 are formed in radial locations around the collet at upper ends of elastic legs 88. The legs are separated by slots 90 to permit the legs to be elastically contracted inwardly during the crimping operation. During the crimping operation, force is exerted to an upper cup 94 to force the upper cup 94 downwardly in the view of Figure 6. As the upper cup 94 descends, spring biasing assemblies 98 are compressed, appropriately locating the inner ring 18 within the inner ring seal 28 supported on the support cup 92. Once these spring assemblies are compressed and the upper cup 94 contacts the collet, the collet is urged downwardly, forcing the crimping sections 86 radially inwardly by cooperation between the collet and the tapered ring 80. Following radial inward movement of the crimping sections, the projection forces plastic deformation of the seal, as indicated at reference numeral 106 of Figure 8. Further, radial inward movement of the crimping sections, as indicated by reference numeral 108 in Figure 8, causes the final crimping or plastic deformation of the seal extension to fix the seal to the inner ring. Upon removal of force from the upper cup,

the entire assembly is free to move upwards and the ring and affixed seal are freed from the installation system.

6. **ISSUES**

Issue No. 1:

Whether claims 8-12, 15-19, 38-43, and 47 are unpatentable under 35 U.S.C. § 103(a) as being obvious over McLarty, U.S. Patent No. 5,242,229

Issue No. 2:

Whether claims 8-21 and 38-47 are unpatentable under 35 U.S.C. § 103(a) as being obvious over McLarty, U.S. Patent No. 5,242,229, or Mondak et al., U.S. Patent No. 5,695,290, in view of Reiter, U.S. Patent No. 4,336,971.

7. **GROUPING OF CLAIMS**

Issue No. 1: Independent claims 8 and 15 stand or fall together. Independent claims 38, 39, 40, and 41 stand or fall separately. Claims 9-12 and 16-19 stand or fall with independent claims 8 and 15. Claims 42 and 47 stand or fall with claim 41.

Issue No. 2: Independent claims 8 and 15 stand or fall together. Independent claims 38, 39, 40, and 41 stand or fall separately. Claims 9-14 and 16-21 stand or fall with independent claims 8 and 15. Claims 42-47 stand or fall with claim 41.

8. **ARGUMENT**

Issue No. 1:

As discussed in detail below, the Examiner has improperly rejected claims 8-12, 15-19, 38-43, and 47 in view of the cited art. Specifically, the Examiner rejected claims 8-12, 15-19, 38-43, and 47 under 35 U.S.C. § 103(a) as being unpatentable over McLarty, U.S. Pat. No. 5,242,229. It is respectfully submitted that the Examiner has misapplied long-standing and binding legal precedents in rejecting the claims under 35 U.S.C. § 103(a). Accordingly, Appellant believes claims 8-12, 15-19, 38-43, and 47 are currently

in condition for allowance, and respectfully requests favorable consideration by the Board.

First, it should be noted that the Examiner contradicts the present rejection with the Examiner's later rejection of claims 8-21 and 38-47 as being obvious over McLarty or Mondak et al., U.S. Pat. No. 5,695,290, in view of Reiter, U.S. Pat. No. 4,336,971. If the Examiner believes that the McLarty reference requires the Reiter reference to render claims 8-21 and 38-47 obvious, then the Examiner cannot simultaneously argue that the McLarty reference alone is sufficient to render claims 8-12, 15-19, 38-43, and 47 obvious. Thus, at a minimum, the present rejection should be withdrawn in favor of the later rejection. This argument was presented to the Examiner in the Amendment and Response to Office Action Mailed January 29, 2003 that was filed on March 7, 2003. However, the Examiner did not respond to this argument in the Office Action mailed on April 24, 2003. The Appellant renews the argument that the present rejection should be withdrawn. However, as will be discussed, claims 8-12, 15-19, 38-43, and 47 are patentable over all of the cited references.

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the

obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

Claims 8-12 and 15-19

Claims 8-12 and 15-19 are patentable because the McLarty reference does not disclose or suggest all of the recited features of the claims. Independent claim 8 recites the following:

8. A method for installing a seal on a bearing assembly, the method comprising:
 forming a first interface surface in an inner bearing ring and a second interface surface in an outer bearing ring;
 crimping a first seal member to the first interface surface of the inner ring;
 crimping a second seal member to the second interface surface of the outer ring; and
 assembling the bearing assembly such that the first and second seal members cooperate with one another to seal at least a portion of the bearing assembly.

In addition, independent claim 15 recites the following:

15. A method for sealing a bearing assembly, the method comprising:
 forming a first interface surface in an inner bearing ring and a second interface surface in an outer bearing ring;
 crimping a first seal member to the first interface surface of the inner ring;
 crimping a second seal member to the second interface surface of the outer ring; and
 assembling the bearing assembly such that the first and second seal members cooperate with one another to seal at least a portion of the bearing assembly;
 wherein at least one of the first and second seal members includes an elastomeric seal configured to contact

the other seal member when the bearing assembly is placed in service.

Some of the recited features of independent claims 8 and 15 that are not disclosed by McLarty are: “crimping a first seal member to the first interface surface of the inner ring” and “crimping a second seal member to the second interface surface of the outer ring.” (Emphasis added).

In section 2 of the Office Action mailed on April 24, 2003, the Examiner admitted that the McLarty reference “does not disclose crimping the first and second pieces of the bearing seal to the inner and outer races of the bearing, respectively.” However, the Examiner went on to state that:

McLarty (sic) prefer erred embodiment is a snap-fit engagement. However, McLarty discloses as prior art, a crimping process as well (see Figure 1).

Regarding claims, 8, 15, and 41, it would have been obvious to one having ordinary skill in the art at the time the invention was made, to have crimped the first and second pieces of the bearing seal to the inner and outer races of the bearing, respectively of McLarty, in light of the teachings of the prior art, in order to secure the seal onto the bearing face so that it cannot be withdrawn.

In addition, in the Response to Arguments portion of the Office Action mailed on April 24, 2003, the Examiner stated that:

The bearing assembly of Figure 2 and 5 having two seal members, is essentially the same as Applicant’s invention with the exception of the crimping. The Examiner used the teaching of the prior art of McLarty to substitute crimping for snap fit, since they are known equivalents for the same purpose.

In contrast to the Examiner’s assertion, the McLarty reference does not disclose or suggest that crimping and a snap-fit engagement are known equivalents. In fact, the

McLarty reference contradicts the Examiner's assertion and actually *teaches away* from using a crimping process in the assembly process. A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, *or would be led in a direction divergent from the path that was taken by the applicant* (emphasis added). *In re Gurley*, 27 F.3d 551, 31 U.S.P.Q.2d 1130 (Fed. Cir. 1994). The teaching away from the use of a crimping process is demonstrated in column 1, lines 32-59 of the McLarty reference, which describes "limitations known to exist" to present sealing structures that provide a "roll crimp." McLarty goes on to state that: "it is apparent that it would be advantageous to provide an alternative (to the "roll crimp") directed to overcoming one or more of the limitations set forth above." Subsequently, McLarty discloses the "snap-fit" engagement noted by the Examiner. Thus, according to the McLarty reference, the roll crimp process and snap-fit engagement clearly are not equivalent. Furthermore, a person of ordinary skill in the art, upon reading the McLarty reference, would be discouraged from using the "roll crimp" process disclosed. Therefore, the McLarty reference actually teaches away from the recited features of independent claims 8 and 15.

In addition, the McLarty reference only discloses a "roll crimp" of one seal member, deformable lip 28. Based on the disclosure and Figure 1 of McLarty, it is not possible to crimp a first seal member *and* a second seal member using the "roll crimp" process described in McLarty because there is no apparent means of reaching *both* members for crimping. Therefore, McLarty does not disclose or suggest all of the recited features of independent claims 8 and 15.

Accordingly, independent claims 8 and 15 are patentable over McLarty. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, claims 9-12 and 16-19, which depend from independent claims 8 and 15, respectively, are nonobvious.

Furthermore, in regard to the rejection of claims 12 and 17, the Examiner has misinterpreted the court's decision in the case of *In re Hutchison*. Specifically, the Examiner stated that: "It has been held that the recitation that an element is "configured to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138."

However, the court in *In re Hutchison* did not hold that an element "configured to" perform a function is not a positive limitation or that "configured to" does not constitute a limitation in any patentable sense, *per se*. In fact, the term "configured to" was not at issue in the case. Rather, the terms "adapted to" and "adapted for" were at issue in the case. The terms "adapted for" and "adapted to" were recited in the preambles of several claims, not in the bodies of the claims. *See In re Hutchison*, 154 F.2d 135, 137 (C.C.P.A. 1946). The Appellant had argued that these terms were a limitation that distinguished the claims from the prior art. *See Id.* The court rejected the Appellant's argument and in its decision the Court stated that the term "adapted to" did not constitute a limitation in any patentable sense. However, this statement was made in the context of the term being found in the preamble of the claim, not that the term "adapted to" was not a positive limitation, *per se*.

In fact, other courts have cited *In re Hutchison* for the proposition that terms found in the preamble of a claim are not limitations, not that the term "adapted to" is not a positive limitation. *See Kropa v. Robie*, 187 F.2d 150 (C.C.P.A. 1951) (See Appendix A. *Ex Parte* cases in which preamble held not to express limitation in claim. Case No. 19); *See also In re Allen*, 343 F.2d 482 (C.C.P.A. 1965). The Applicant found no case in which *In re Hutchison* was cited by another court for the proposition that the term "adapted to" does not recite a positive limitation or has no patentable sense, *per se*. Thus, *In re Hutchison* does not support the Examiner's assertion that "[i]t has been held that the recitation that an element is 'configured to' perform a function is not a positive limitation but only requires the ability to so perform" or that "It does not constitute a limitation in

any patentable sense.” Let it be noted that in the present claims, the term “adapted to” is recited in the bodies of the claims, not in the preambles.

Furthermore, M.P.E.P. § 2173.05(g) specifically cites an example where the term “adapted to” was found to precisely define present structural attributes of interrelated components. M.P.E.P. § 2173.05(g) states that:

In a claim that was directed to a kit of component parts capable of being assembled, the Court held that limitations such as “members adapted to be positioned” and “portions...being resiliently dilatable whereby said housing may be slidably positioned” serve to precisely define present structural attributes of interrelated component parts of the claimed assembly (emphasis added). *In re Venezia*, 530 F.2d 956, 189 U.S.P.Q. 149 (CCPA 1976).

For all of these reasons, there is no support in the cited case or in the M.P.E.P. for the Examiner’s assertion that “it has been held that the recitation that an element is ‘configured to’ perform a function is not a positive limitation but only requires the ability to so perform. Therefore, for the reasons provided above, the limitations disclosed therein must be considered.

Claims 41, 42, and 47

In addition, claims 41, 42, and 47 are patentable because the McLarty reference does not disclose or suggest all of the recited features of the claims. Independent claim 41 recites the following:

41. A method for installing a seal in a bearing assembly, the method comprising:
positioning a first seal member adjacent to a first annular interface in an inner ring;
positioning a second seal member adjacent to a second annular interface in an outer ring;

crimping the first seal member to deform a portion of the first seal member into the first annular interface in the inner ring;

crimping the second seal member to deform a portion of the second seal member into the second annular interface in the outer ring; and

assembling the bearing assembly such that the first and second seal members cooperate with one another to seal at least a portion of the bearing assembly.

Some of the recited features of claim 41 that are not disclosed or suggested by McLarty are “crimping the first seal member to deform a portion of the first seal member into the first annular interface in the inner ring” and “crimping the second seal member to deform a portion of the second seal member into the second annular interface in the outer ring,” as recited in independent claim 41. (Emphasis added).

As discussed above, the Examiner admitted in section 2 of the Office Action mailed on April 24, 2003 that the McLarty reference “does not disclose crimping the first and second pieces of the bearing seal to the inner and outer races of the bearing, respectively.” However, in contrast to the Examiner’s assertions, McLarty not only does not disclose or suggest: “crimping the first and second pieces of the bearing seal to the inner and outer races of the bearing,” the reference actually taught away from the recited feature. Specifically, the McLarty reference specifically referred to the limitations to sealing structures that utilized a “roll crimp.” *See* McLarty, col. 1, line 53. In addition, McLarty went on to state that: “it is apparent that it would be advantageous to provide an *alternative* (to the “roll crimp”) directed to overcoming one or more of the limitations set forth above.” (Emphasis added). The alternative provided was a “snap-fit” engagement. Thus, in McLarty’s eyes, the two methods clearly are not equivalent. Therefore, the McLarty reference actually teaches away from the recited features of independent claim 41.

In addition, as noted above, the McLarty reference only discloses performing a single “roll crimp” of a seal member. The McLarty reference does not disclose or

suggest “crimping the first seal member to deform a portion of the first seal member into the first annular interface in the inner ring” and “crimping the second seal member to deform a portion of the second seal member into the second annular interface in the outer ring,” as recited in independent claim 41. Therefore, McLarty does not disclose or suggest all of the recited features of independent claim 41.

Claims 38-40

In the Office Action mailed on April 24, 2003, the Examiner stated that: “Regarding claims 38-40, the product is inherently disclosed by the method of forming it.” However, as discussed above, the McLarty reference does not disclose the method of forming the bearing assemblies. Therefore, claims 38-40 are patentable over the cited references.

For all of these reasons, claims 8-12, 15-19, 38-43, and 47 are patentable over the McLarty reference. Favorable consideration by the Board is respectfully requested.

Issue No. 2:

As discussed in detail below, the Examiner has improperly rejected claims 8-21 and 38-47 in view of the cited art. Specifically, the Examiner rejected claims 8-21 and 38-47 under 35 U.S.C. § 103(a) as being unpatentable over McLarty, U.S. Pat. No. 5,242,229 or Mondak et al. (hereinafter “Mondak”), U.S. Pat. No. 5,695,290, in view of Reiter, U.S. Pat. No. 4,336,971. It is respectfully submitted that the Examiner has misapplied long-standing and binding legal precedents in rejecting the claims under 35 U.S.C. § 103(a). Accordingly, Appellant believes claims 8-21 and 38-47 are currently in condition for allowance, and respectfully requests favorable consideration by the Board.

Claims 8-21

Claims 8-12 and 15-21 are patentable because the cited references do not disclose or suggest all of the recited features of the claims and because there is no suggestion to combine the references. As with the rejection of claims 8 and 15 by the McLarty reference alone discussed above, some of the recited features of independent claims 8 and 15 that are not disclosed by the cited references, either alone or in combination, are: “crimping a first seal member to the first interface surface of the *inner* ring” and “crimping a second seal member to the second interface surface of the *outer* ring.” (Emphasis added). In section 3 of the Office Action mailed on April 24, 2003, the Examiner admitted that the McLarty and Mondak references “do not disclose crimping the first and second pieces of the bearing seal to the inner and outer races of the bearing, respectively.” See Office Action mailed on April 2, 2003, page 4, lines 4-5. The Examiner went on to state that:

Reiter discloses a method for assembling a bearing seal. “Initially, the end of the axial wall 62 on each case 60 is straight so that it easily fits over the turned down end surface 34 on the cup 24 or 26, but once the seal case 60 is pressed onto the cup 24 or 26, its axial wall 62 is deformed inwardly into annular groove 32 adjoining the turned down surface 34 to secure the seal case 60 firmly on the cup 24 or 26.” (col. 6, lines 35-41).

However, the Reiter reference fails to obviate the admitted failures of the McLarty and Mondak references to disclose or suggest these recited features. The annular groove 32 of the cup 24 or 26 is located on the outside of the seal case 62. *See* Reiter, Fig 2. Therefore, at most, the pressing of the axial wall 62 of the seal case 60 into the annular groove 32 of the cup 24 or 26 represents “crimping a second seal member to the second interface surface of the *outer* ring.” However, the Reiter reference does not disclose or suggest “crimping a first seal member to the first interface surface of the *inner* ring” in addition to “crimping a second seal member to the second interface surface of the *outer* ring.” Furthermore, none of the other cited reference disclose or suggest how to

perform the recited feature. Therefore, the cited references, either alone or in combination, do not disclose or suggest all of the recited features of the claims.

In addition, the Examiner has not established a *prima facie* case for obviousness because there is no teaching or suggestion supporting the proposed combination. In fact, as discussed above, the McLarty reference clearly teaches away from the proposed combination. Furthermore, it is clear that all of the prior art references cited by Examiner in the 35 U.S.C. 103 objections merely teach “snap fit” seals or “snap fit” seals in combination with crimped seals. None of the references cited by Examiner discloses multiple crimped seals, especially crimped seals on inner rings, as well as outer rings. One reason crimping is a better solution than using a snap fit is because crimping creates a more secure attachment that is less susceptible to wear. A mere snap fit will be more susceptible to movement within an associated groove. This movement, often referred to as “walking,” is a result of drag forces placed on the moving elements of the bearing and can be detrimental to proper operation and can lead to wear. The multiple crimped seals, as claimed, provide more secure attachments that resist such drag forces, and prevent or limit problems associated with walking.

For all of these reasons, claims 8 and 15 are not obvious over McLarty or Mondak in view of Reiter. The claims depending from claims 8 and 15 are believed to be clearly patentable both for the subject matter they separately recite, as well as by virtue of their dependency from an allowable base claim.

Claims 41-47

Claims 41-47 are patentable because the cited references do not disclose or suggest all of the recited features of the claims. Some of the recited features of claim 41 that are not disclosed or suggested by the cited references are “crimping the first seal member to deform a portion of the first seal member into the first annular interface in the inner ring” and “crimping the second seal member to deform a portion of the second seal member into the

second annular interface in the outer ring,” as recited in independent claim 41. (Emphasis added).

As discussed above, in section 3 of the Office Action mailed on April 24, 2003, the Examiner admitted that the McLarty and Mondak references “do not disclose crimping the first and second pieces of the bearing seal to the inner and outer races of the bearing, respectively.” However, the Reiter reference also fails to disclose these recited features. As noted above, the Reiter reference only discloses pressing an axial wall 62 of a seal case 60 into an annular groove 32 of a cup 24 or 26. represents “crimping a second seal member to the second interface surface of the *outer* ring.” Therefore, the cited references, either alone or in combination, do not disclose or suggest all of the recited features of the claims.

In addition, the Examiner has not established a *prima facie* case for obviousness because there is no teaching or suggestion supporting the proposed combination. In fact, as discussed above, the McLarty reference clearly teaches away from the proposed combination. Furthermore, it is clear that all of the prior art references cited by Examiner in the 35 U.S.C. 103 objections merely teach “snap fit” seals or “snap fit” seals in combination with crimped seals. None of the references cited by Examiner discloses multiple crimped seals. One reason crimping is a better solution than using a snap fit is because crimping creates a more secure attachment that is less susceptible to wear. A mere snap fit will be more susceptible to movement within an associated groove. This movement, often referred to as “walking,” is a result of drag forces placed on the moving elements of the bearing and can be detrimental to proper operation and can lead to wear. The multiple crimped seals, as claimed, provide more secure attachments that resist such drag forces, and prevent or limit problems associated with walking.

However, in contrast to the Examiner’s assertions, McLarty not only does not disclose or suggest: “crimping the first and second pieces of the bearing seal to the inner and outer races of the bearing,” the reference actually taught away from the recited

feature. Specifically, the McLarty reference specifically referred to the limitations to sealing structures that utilized a “roll crimp.” Column 1, line 53. In addition, McLarty went on to state that: “it is apparent that it would be advantageous to provide an *alternative* (to the “roll crimp”) directed to overcoming one or more of the limitations set forth above.” (Emphasis added). The alternative provided was a “snap-fit” engagement. Thus, in McLarty’s eyes, the two methods clearly are not equivalent. Therefore, the McLarty reference actually teaches away from the recited features of independent claim 41.

In addition, as noted above, the McLarty reference only discloses performing a single “roll crimp” of a seal member. The McLarty reference does not disclose or suggest “crimping the first seal member to deform a portion of the first seal member into the first annular interface in the inner ring” and “crimping the second seal member to deform a portion of the second seal member into the second annular interface in the outer ring,” as recited in independent claim 41. Therefore, McLarty does not disclose or suggest all of the recited features of independent claim 41.

Claims 38-40

In the Office Action mailed on April 24, 2003, the Examiner stated that: “Regarding claims 38-40, the product is inherently disclosed by the method of forming it.” However, as discussed above, the McLarty reference does not disclose the method of forming the bearing assemblies. Therefore, claims 38-40 are patentable over the cited references.

For all of these reasons, claims 8-21 and 38-47 are patentable over the cited references. Favorable consideration by the Board is respectfully requested.

10. **APPENDIX OF CLAIMS ON APPEAL**

1-7 (canceled):

8. (original): A method for installing a seal on a bearing assembly, the method comprising:

forming a first interface surface in an inner bearing ring and a second interface surface in an outer bearing ring;

crimping a first seal member to the first interface surface of the inner ring;

crimping a second seal member to the second interface surface of the outer ring; and

assembling the bearing assembly such that the first and second seal members cooperate with one another to seal at least a portion of the bearing assembly.

9. (original): The method of claim 8, wherein the first interface surface includes an annular groove.

10. (original): The method of claim 8, wherein the second interface surface includes an annular groove.

11. (original): The method of claim 8, wherein at least one of the first and second seal members includes an elastomeric seal configured to contact the other seal member.

12. (original): The method of claim 8, wherein at least one of the first and second seal members includes an elastomeric seal configured to contact an element of a rotational system within which the bearing assembly is placed.

13. (original): The method of claim 8, wherein each of the crimping steps includes the steps of centering the respective seal member in a respective collet and urging the respective bearing ring into the seal member to close the collet around the seal member.

14. (original): The method of claim 13, wherein each of the collets includes a plurality of flexible fingers each terminating in a crimping head, and wherein the collet is disposed to undergo elastic deformation of the flexible fingers as the portion of the respective seal member is crimped to the respective interface surface.

15. (original): A method for sealing a bearing assembly, the method comprising:

forming a first interface surface in an inner bearing ring and a second interface surface in an outer bearing ring;

crimping a first seal member to the first interface surface of the inner ring;

crimping a second seal member to the second interface surface of the outer ring; and

assembling the bearing assembly such that the first and second seal members cooperate with one another to seal at least a portion of the bearing assembly;

wherein at least one of the first and second seal members includes an elastomeric seal configured to contact the other seal member when the bearing assembly is placed in service.

16. (original): The method of claim 15, wherein the elastomeric seal is supported a support ring of the second seal member.

17. (original): The method of claim 16, wherein a portion of the elastomeric seal is configured to contact an element of a rotating system when the bearing assembly is placed in service.

18. (original): The method of claim 15, wherein the first interface surface includes an annular groove.

19. (original): The method of claim 15, wherein the second interface surface includes an annular groove.

20. (original): The method of claim 15, wherein the first seal member is crimped to the inner ring by urging the inner ring into engagement with the first seal member to force a first flexible collet to compress around the first seal member.

21. (original): The method of claim 15, wherein the second seal member is crimped to the outer ring by urging the outer ring into engagement with the second seal member to force a second flexible collet to compress around the second seal member.

22-37 (canceled):

38. (previously presented): A bearing assembly made by the method of claim 41.

39. (previously presented): A bearing assembly made by the method of claim 8.

40. (previously presented): A bearing assembly made by the method of claim 15.

41. (previously presented): A method for installing a seal in a bearing assembly, the method comprising:

positioning a first seal member adjacent to a first annular interface in an inner ring;
positioning a second seal member adjacent to a second annular interface in an outer ring;

crimping the first seal member to deform a portion of the first seal member into the first annular interface in the inner ring;

crimping the second seal member to deform a portion of the second seal member into the second annular interface in the outer ring; and

assembling the bearing assembly such that the first and second seal members cooperate with one another to seal at least a portion of the bearing assembly.

42. (previously presented): The method of claim 41, further comprising forming the first annular interface in the inner ring.

43. (previously presented): The method of claim 41, further comprising forming the second annular interface in the outer ring.

44. (previously presented): The method of claim 41, further comprising: centering at least one of the first seal member and second seal member in a collet; and

slidably engaging at least one of the inner ring and the outer ring into the at least one of the first seal member and the second seal member to close the collet around the respective one of the first seal member and the second seal member.

45. (previously presented): The method of claim 44, wherein the collet includes a plurality of flexible fingers each terminating in a crimping head, and disposing the collet to undergo elastic deformation of the plurality of flexible fingers as the respective portion of the at least one of the first seal member and second seal member is crimped into the respective at least one of the first annular interface and the second annular interface.

46. (previously presented): The method of claim 41, wherein at least one of the first seal member and the second seal member includes a flinger.

47. (previously presented): The method of claim 41, wherein at least one of the first seal member and the second seal member supports an elastomeric seal, the at least one of the first seal member and the second seal member comprising part of an annular support ring.

9. **CONCLUSION**

The Commissioner is authorized to charge the requisite fee of \$320.00, and any additional fees which may be required, to Account No. 01-0857, Order No. DODG:0046/YOD (01RE145). A duplicate copy of this sheet is enclosed.

Respectfully submitted,



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